

## CLAIMS

1. An optical multi-branched communication system in which a plurality of slave station devices share a transmission medium and a transmission band; a master station device notifies band allocation information for controlling allocation of transmission bands to be used for each slave station device to each of the slave stations; and each slave station device transmits transmission information to the master station device, based on band allocation information notified from the master station device,

wherein said master station device comprises an extracting unit which extracts traffic notification information which is described in predetermined information in the transmission information transmitted from each slave station device, and notifies the traffic state of the transmission information, and

said master station device performs allocation processing of the transmission bands, based on the traffic notification information extracted by said extracting unit, and notifies the allocated results to each of said slave station devices as the band allocation information.

2. The optical multi-branched communication system according to claim 1,

wherein said master station device comprises a band

allocation unit which processes allocation of the transmission bands based on the traffic notification information extracted by said extracting unit, and

5 said band allocation unit divides the whole bands for all of said slave station devices into fixed bands which have been previously set for each of said slave station devices, and redundant bands which each of said slave station devices share, and performs allocation processing of the redundant bands based on the traffic notification  
10 information extracted by said extracting unit.

3. The optical multi-branched communication system according to claim 1, wherein the band allocation information is allocated for each logical path of the transmission  
15 information.

4. The optical multi-branched communication system according to claim 1, wherein the traffic notification information is payload-type information in ATM cell headers.  
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5. The optical multi-branched communication system according to claim 1, wherein said extracting unit outputs the transmission information after changing the traffic notification information again.  
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6. An optical multi-branched communication system in which a plurality of slave station devices share a transmission medium and a transmission band; a master station device notifies band allocation information for controlling allocation of transmission bands to be used for each slave station device to each of the slave stations; and each of said slave station devices transmits transmission information to said master station device, based on band allocation information notified received from said master station device,

wherein each of said slave station devices comprises a congestion detection unit which detects whether the resident quantity of transmission information to be transmitted to said master station device is equal to or larger than a predetermined threshold, and

a changing unit which changes the contents of the traffic notification information, which is described in predetermined information of the transmission information, to a congestion state, when said congestion detection unit detects that the resident quantity is equal to or larger than the predetermined threshold, and notifies the traffic state of the transmission information;

wherein said master station device comprises an extracting unit which extracts traffic notification information which is described in predetermined information

in transmission information transmitted from each of said slave station devices; and

said master station device performs allocation processing of the transmission bands based on the traffic notification information extracted by said extracting unit, and notifies the allocated results as the band allocation information to each of said slave stations.

7. The optical multi-branched communication system according to claim 6, wherein each of said slave station devices further comprises

a plurality of buffers for temporary accumulation of plural series of pieces of transmission information to be output to the master station device, and

a selective reading-out unit which selectively reads out, based on the band allocation information from said master station device, each series of pieces of transmission information which have been temporarily accumulated in the plural buffers,

wherein said changing unit changes the traffic notification information of each series of pieces of transmission information which have been read out from each of said buffers.

8. The optical multi-branched communication system according to claim 6, wherein each of said slave station devices further comprises

a plurality of buffers for temporary accumulation of plural series of pieces of transmission information to be output to said master station device,

a plurality of reading-out units which reads-out, based on the band allocation information from said master station device, a series of pieces of transmission information, respectively, which are corresponding to said buffers, respectively, and have been temporarily accumulated in each of said buffers, and

an INCLUSIVE-OR operation unit which performs INCLUSIVE-OR operation with respect to the transmission information, which have been read out by each of said reading-out units, to send the operation results to said master station device,

wherein said changing unit changes the traffic notification information of each series of pieces of transmission information which have been read out from each of said buffers, and

wherein said master station device performs band allocation processing of each series of plural pieces of transmission information which have been input to a plurality of the buffers.

9. The optical multi-branched communication system according to claim 6, further comprising an information multiplexing unit provided at a previous stage to said slave station devices, for multiplexing beforehand plural series  
5 of pieces of transmission information which are to be input into each of said slave station devices,

wherein said congestion detection unit of each of said slave station devices performs congestion notification to said information multiplexing unit when the resident  
10 quantity of transmission information to be transmitted to said master station device is equal to or larger than the predetermined threshold, and

said information multiplexing unit performs control to reducing the number of pieces of transmission information  
15 to be sent to said slave station devices after multiplexing, when the congestion notification is received.

10. The optical multi-branched communication system according to claim 6,

20 wherein said master station device comprises a band allocation unit which processes allocation of the transmission bands based on the traffic notification information extracted by said extracting unit, and

said band allocation unit divides the whole bands for  
25 all of said slave station devices into fixed bands which

have been previously set for each of said slave station devices, and redundant bands which each of said slave station devices share, and performs allocation processing of the redundant bands based on the traffic notification information extracted by said extracting unit.

11. The optical multi-branched communication system according to claim 6, wherein the band allocation information is allocated for each logical path of the transmission information.

12. The optical multi-branched communication system according to claim 6, wherein the traffic notification information is payload-type information in ATM cell headers.

13. The optical multi-branched communication system according to claim 6, wherein said extracting unit outputs the transmission information after changing the traffic notification information again.

14. A master station device which is used for an optical multi-branched communication system in which a plurality of slave station devices share a transmission medium and a transmission band, wherein the master station device notifies band allocation information for controlling

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allocation of transmission bands to be used for each slave station device to each of said slave stations; and each of said slave station devices transmits transmission information to said master station device, based on band allocation information notified from said master station device,

wherein said master station device comprises an extracting unit which extracts traffic notification information which is described in predetermined information in the transmission information transmitted from each slave station device, and notifies the traffic state of the transmission information, and

wherein an allocation processing of the transmission bands is performed, based on the traffic notification information extracted by said extracting unit, and

the allocated results are allocated to each of said slave station devices as the band allocation information.

15. A slave station device which is used for an optical multi-branched communication system in which a plurality of slave station devices share a transmission medium and a transmission band; a master station device notifies band allocation information for controlling allocation of transmission bands to be used for each slave station device to each of said slave stations; and each of said slave station



devices transmits transmission information to said master station device, based on band allocation information notified from said master station device,

wherein said slave station device comprises

5 a congestion detection unit which detects whether the resident quantity of transmission information to be transmitted to said master station device is equal to or larger than a predetermined threshold, and

10 a changing unit in which the contents of the traffic notification information which is described in predetermined information of the transmission information and notifies the traffic state of the transmission information are changed to the congestion state, when said congestion detection unit detects that the resident quantity  
15 is equal to or larger than the predetermined threshold.

16. The slave station device according to claim 15, further comprising an information multiplexing unit provided at a previous stage to said slave station devices,  
20 for multiplexing beforehand plural series of pieces of transmission information which are to be input into each of said slave station devices, and

wherein said congestion detection unit performs congestion notification to said information multiplexing  
25 unit which is provided at a previous stage to said slave

station devices, for multiplexing beforehand plural series of pieces of transmission information which are to be input into the slave station devices, when the resident quantity of transmission information to be transmitted to said master station device is equal to or larger than the predetermined threshold, and the number of transmission information transmitted by said information multiplexing unit is reduced.

10 17. A method of controlling optical multi-branched communication bands, by which a plurality of slave station devices share a transmission medium and a transmission band; a master station device notifies band allocation information for controlling allocation of transmission bands to be used  
15 for each slave station device to each of the slave stations; and each of said slave station devices transmits transmission information to said master station device, based on band allocation information notified from the master station device, the method comprising:

20 a congestion detection step in which each of said slave station devices detects whether the resident quantity of transmission information to be transmitted to said master station device is equal to or larger than a predetermined threshold,

25 a changing step in which, when it is detected at the

congestion detection step that the resident quantity is equal to or larger than the predetermined threshold, the contents of the traffic notification information, which is described in predetermined information of the transmission information, and notifying the traffic state of the transmission information, are changed to a congestion state,

an extracting step in which said master station device extracts traffic notification information in the transmission information, and

a notification step in which said master station device performs allocation processing of the transmission bands, based on the traffic notification information extracted in the extraction step; and notifying the results of allocation to each of said slave station devices as the band allocation information.

18. The method of controlling optical multi-branched communication bands according to claim 17,

wherein when the resident quantity of transmission information to be transmitted to said master station device is equal to or larger than the predetermined threshold, congestion notification is performed, at the congestion detection step, to an information multiplexing unit which is provided at a previous stage to said slave station devices, for multiplexing beforehand transmission information which

are to be input into each of said slave station devices,  
and the number of pieces of transmission information to be  
transmitted from said information multiplexing unit is  
reduced.

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19. The method of controlling optical multi-branched  
communication bands according to claim 17, wherein the band  
allocation information is allocated for each logical path  
of the transmission information.

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20. The method of controlling optical multi-branched  
communication bands according to claim 17, wherein the  
traffic notification information is payload-type  
information in ATM cell headers.

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